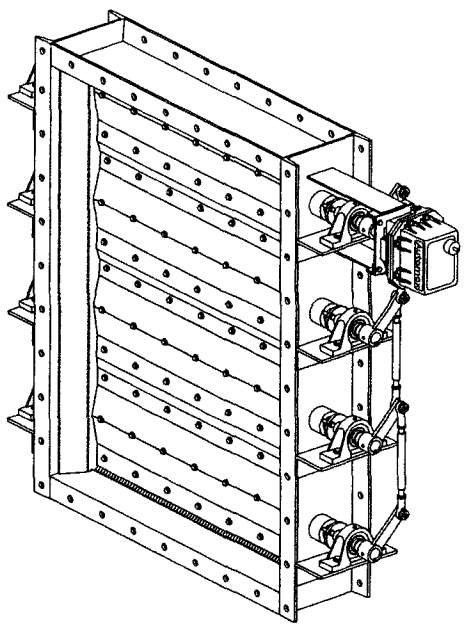
MADER DAMPERS

# INSTALLATION & MAINTENANCE MANUAL FOR



# LOUVER DAMPERS

## BABCOCK BORSIG POWER
## P.O.#: 431521
## MADER DAMPER JOB#: MV-4618

# INSTALLATION

1. BEFORE INSTALLATION OF DAMPER CHECK ALL BOLTS AND NUTS WHICH FASTEN THE ACTUATOR AND OTHER ACCESSORIES FOR TIGHTNESS. VIBRATION DUE TO SHIPPING MIGHT LOOSEN SOME OF THE FASTENERS.

2. VISUALLY CHECK THE DAMPER FOR ANY DAMAGED/BROKEN PARTS.

3. WIPE FLANGE FACES AND INTERNAL BODY TO REMOVE ANY FOREIGN MATERIALS.

4. IF LIFTING LUGS ARE PROVIDED THEY SHOULD BE USED WHEN LIFTING THE DAMPER TO PREVENT STRAIN OR DISTORTION TO THE FRAME.

   MADER RECOMMENDS THAT THE DAMPER BE INSTALLED WITH THE SHAFTS HORIZONTAL. THIS ORIENTATION WILL GIVE YOU MAXIMUM BEARING LIFE. HOWEVER, IF THE SHAFTS ARE TO BE INSTALLED VERTICALLY, MADER WILL HAVE SUPPLIED THRUST BEARINGS. THE DAMPERS SHOULD BE INSTALLED WITH THE THRUST BEARINGS ON THE BOTTOM TO CARRY THE RADIAL/AXIAL LOADS.

6. THE DAMPER WILL HAVE AN ARROW TO ILLUSTRATE DIRECTION OF AIR FLOW.

7. LOCATE THE DAMPER BETWEEN THE FLANGES (GASKETS SHOULD BE USED). WE RECOMMEND THE USE OF DRIFT PINS TO POSITION THE DAMPER FLANGES TO THE DUCTWORK FLANGES. THE FLANGE DRILLING SHOULD BE WITHIN A TOLERANCE OF (+ OR −) .0312 INCHES. THE DUCTWORK FLANGE SHOULD BE CHECKED TO MAKE SURE THAT IT IS LEVEL AND TRUE. THIS WILL ELIMINATE TWISTING AND STRAINING ON THE DAMPER FRAME.

8. BEFORE COMPLETELY INSTALLING ALL MOUNTING BOLTS, NUTS AND LOCKWASHERS, CHECK THE CLEARANCE BETWEEN THE MATING DUCT-WORK AND THE DAMPER BLADES. IT IS IMPERATIVE THAT THERE BE PROPER ALIGNMENT AND CLEARANCES TO ALLOW THE FREE MOVEMENT OF THE DAMPER BLADES. THIS IS ONLY IMPORTANT WHEN THE BLADES EXTEND BEYOND THE BODY.

9. CHECK ALL BLADE SEALS TO MAKE SURE THAT THEY HAVE NOT BEEN DAMAGED.

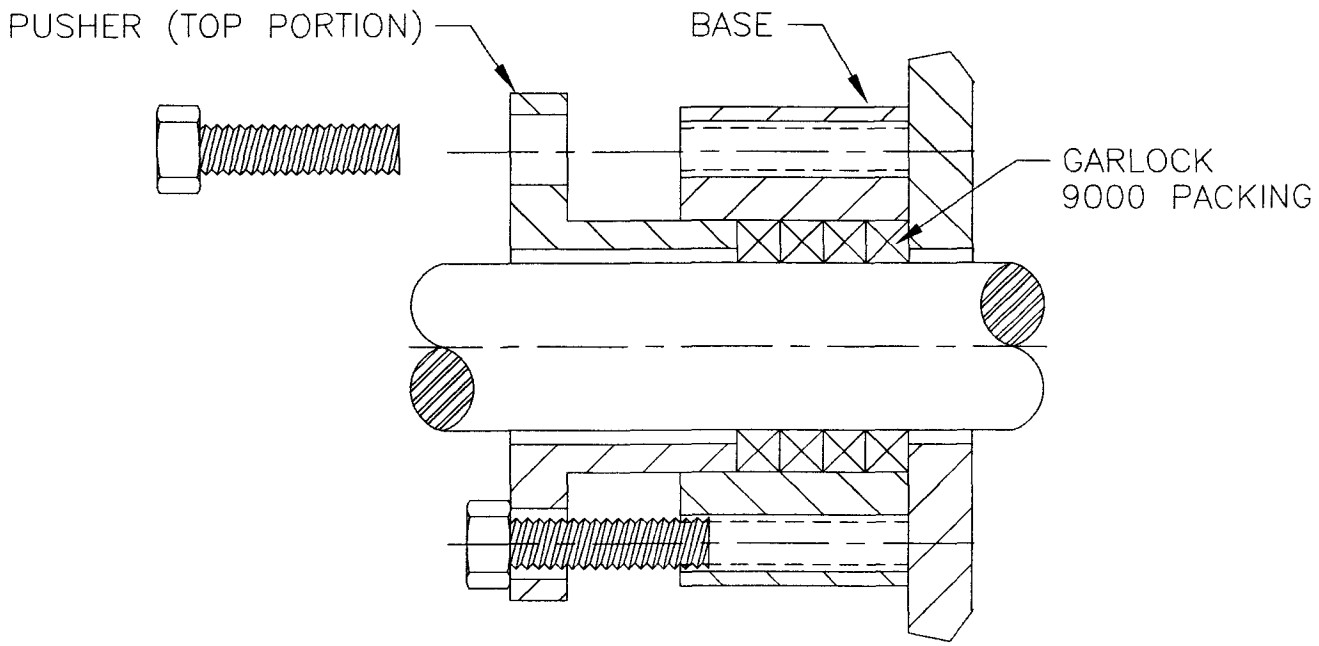
10. THE DAMPER SHOULD BE CYCLED TO INSURE THAT THE UNIT IS OPERATING SATISFACTORILY.

11. DAMPERS SHALL NOT BE USED FOR STRUCTURAL SUPPORT FOR OTHER STRUCTURAL COMPONENTS.

# PACKING GLAND

ON DAMPERS THAT ARE PROVIDED WITH PACKING GLAND. THIS TYPE OF PACKING RING DOES NOT REQUIRE LUBRICATION, THEY ARE SELF LUBRICATING.

MADER'S STUFFING BOX IS BOLT DRAWN COMPRESSION. TO REMOVE OR REPLACE THE PACKING, REMOVE THE BOLTS AND SLIDE THE TOP PORTION OF THE STUFFING BOX OUTWARD UNTIL IT CLEARS THE LOWER PORTION OF OF THE BOX. YOU CAN NOW REMOVE THE OLD PACKING AND REPLACE IT WITH NEW GARLOCK 9000 PACKING (NON-ASBESTOS).

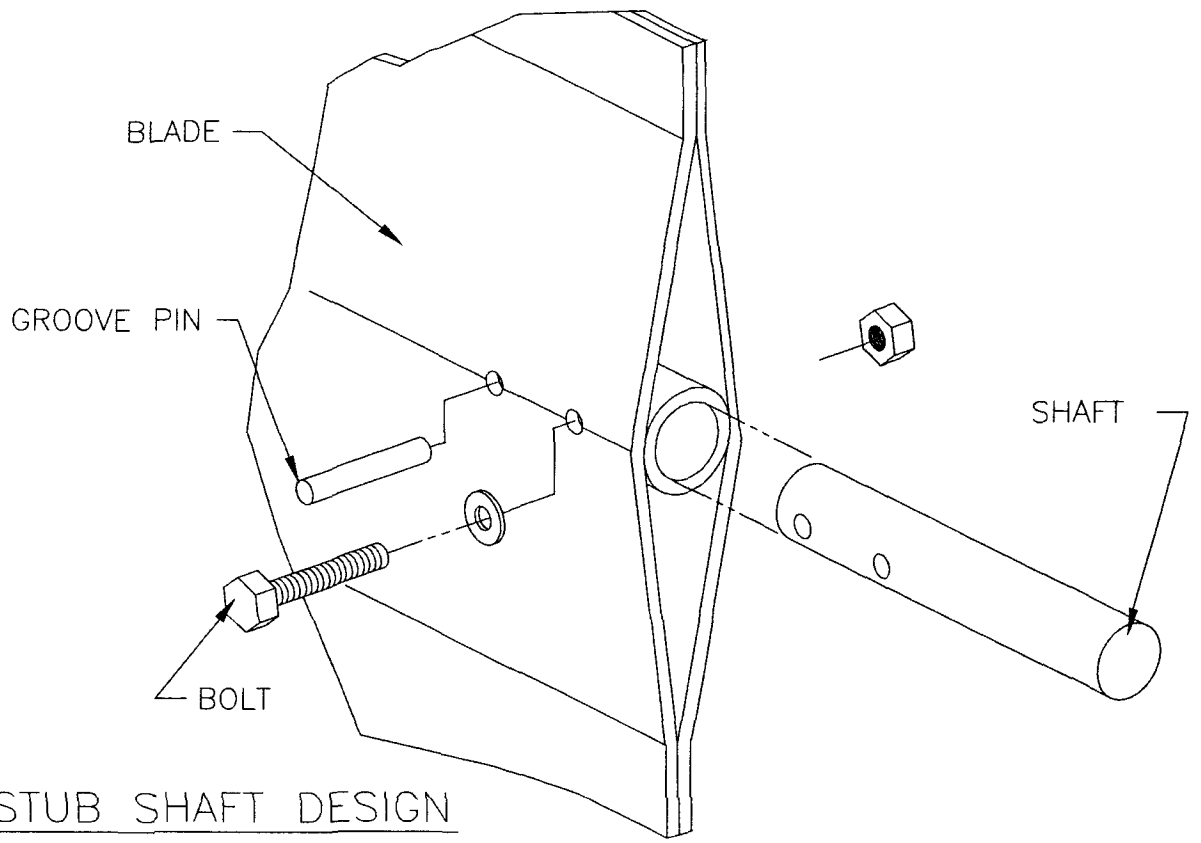



WHEN BALL BEARINGS OR ROLLER BEARINGS ARE USED, THEY WILL BE SUPPLIED ON A BRACKET. THEY WILL REQUIRE PERIODIC LUBRICATION. MADER SUGGESTS THE LUBRICANT WHICH IS RECOMMENDED BY THE BEARING MANUFACTURER.

PLEASE SEE MAINTENENCE SECTION OF THIS MANUAL.

# BLADE AND SHAFT

MADER PROVIDES REMOVABLE BLADE AND SHAFTS ON OUR LOUVER DAMPERS. TO REMOVE BLADES AND SHAFTS ALL LINKAGES AND OPERATORS WILL HAVE TO BE REMOVED. THE SHAFTS ARE BOLTED AND PINNED TO THE BLADE. REMOVE THE BOLTS AND PINS, THIS WILL ALLOW SHAFT AND BLADE REPLACEMENT.



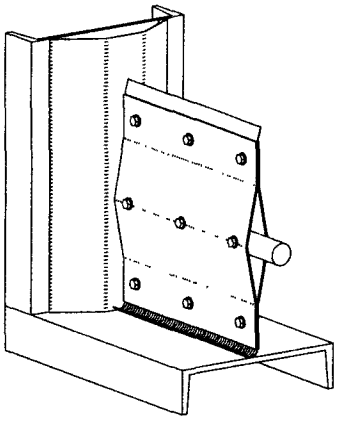

STUB SHAFT DESIGN

# SEAL REPLACEMENT

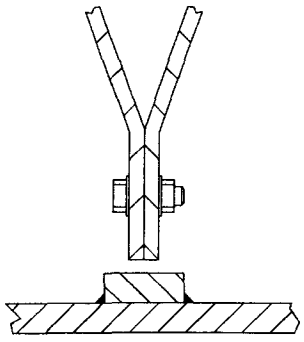
LOUVER VALVES

MADER OFFERS A VARIETY OF SEAT DESIGNS, BUT ONLY THE DAMPERS THAT ARE USING ELASTOMER (RUBBER), SPRING STEEL, OR TADPOLE SEATS ARE REPLACEABLE.

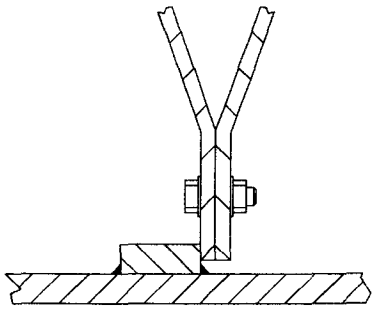
MADER INCORPORATES A BASE PLATE AND RETAINING BAR WHICH IS BOLT DRAWN TO APPLY PRESSURE ON THE RETAINER SEAL. TO REPLACE THESE YOU SIMPLY REMOVE THE NUTS AND LIFT THE RETAINER OFF AND AWAY FROM THE BASE PLATE. REPLACE WITH NEW SEAL MATERIAL AND REPLACE RETAINER BAR BACK ON TOP, RETIGHTEN NUTS. IN AN AREA WHERE VIBRATION EXISTS THESE NUTS SHOULD BE TACK WELDED AFTER TIGHTENING.



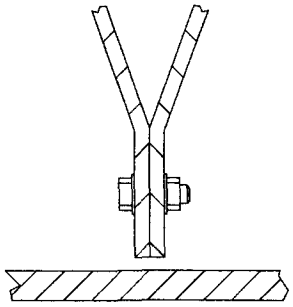
BLADE SEALS



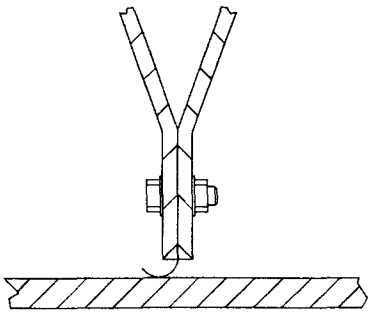
SCISSOR SEAT



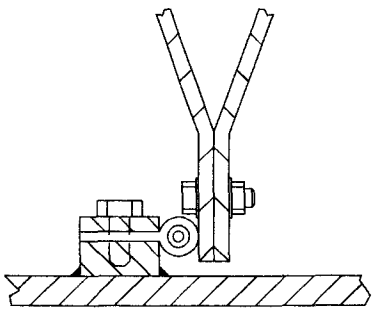
STEP SEAT



SWING THRU



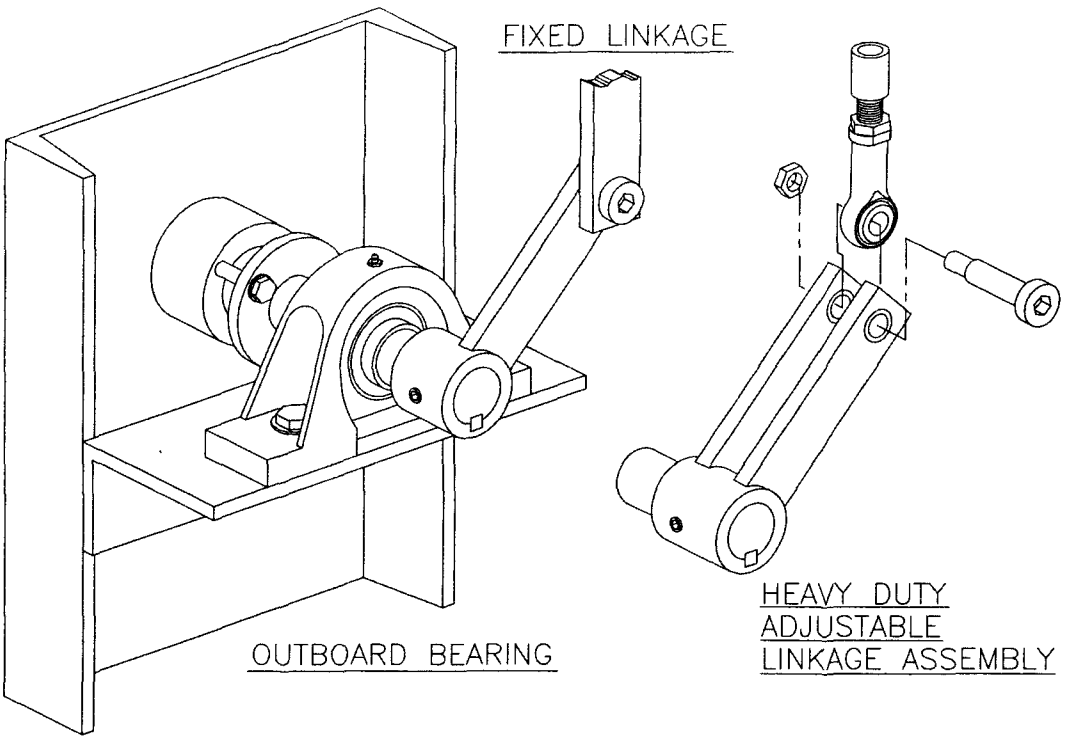
SPRING SEAT



TADPOLE SEAT

BLADES WITH SPRING STEEL SEALS, MAY AT SOMETIME BECOME NECESSARY TO REPLACE AFTER A LENGTH OF TIME IN SERVICE. THE SEALS ARE BOLTED TO THE BLADE. REMOVE THE BOLTS AND OLD SEALS AND REPLACE WITH NEW SEAL MATERIAL FROM MADER DAMPERS.

# LINKAGE




## LINKAGE

MADER OFFERS BOTH A FIXED AND ADJUSTABLE LINKAGE. BOTH ARE DESIGNED TO DELIVER FULL OPERATOR TORQUES WITHOUT BACK LASH.

NORMALLY THE FIXED LINKAGE IS PROVIDED ON THE PARALLEL LOUVER DAMPERS. THE LINKAGE BAR IS A COLD ROLLED STEEL BAR THAT IS MACHINED TO ACCEPT PRESSED IN BRONZE OILITE BUSHINGS THAT ARE SELF LUBRICATING. SHOULDER BOLTS ARE USED TO CONNECT THE LEVER ARMS TO THE LINKAGE BAR.

THE ADJUSTABLE LINKAGE IS RECOMMENDED ON OPPOSED BLADED DAMPERS AS WELL AS HIGH TEMPERATURE AND LOW LEAKAGE APPLICATIONS. THE ADJUSTABLE LINKAGE ALLOWS YOU TO ADJUST EACH BLADE TO ENSURE PROPER SEALING AFTER START-UP IF THE TEMPERATURE HAS AFFECTED THE DAMPER SETTING AT THE FACTORY.

MADER RECOMMENDS THAT THE LINKAGE ARMS ALWAYS BE OF THE KEYED AND SET SCREW DESIGN. THIS ALLOWS FOR EASY REMOVAL AT ANY TIME AFTER YEARS OF SERVICE IN HARSH ENVIRONMENTS.

THE LINKAGE WILL ALLOW INDEPENDENT BLADE ADJUSTMENT. THE ADJUSTMENT IS ACHIEVED BY LOOSENING THE LOCK NUTS AND ROTATING THE LINKAGE BAR TO THE DESIRED POSITION. THEN RETIGHTEN THE LOCK NUTS.

# INSTRUCTION MANUAL FOR DODGE SOLIDLUBE BEARINGS

IMPORTANT: DO NOT LUBRICATE BEARINGS, OIL OR GREASE IS DETRIMENTAL TO THE LIFE OF DODGE SOLIDLUBE BEARINGS.

## SOLID FILM LUBRICATION

SOLID FILM LUBRICATING BEARING MATERIAL WILL TRANSFER A FILM OR COATING OF LUBRICANT TO THE SHAFT AS THE SHAFT ROTATES. THIS FILM OR COATING PREVENTS METAL TO METAL CONTACT BETWEEN THE SHAFT AND BEARING MATERIAL, AS THE SHAFT ACTUALLY RIDES UPON THE LUBRICATN AND NOT UPON THE BEARING ITSELF, BECAUSE IT IS A SOLID, THE LUBRICANT WILL NOT SQUEEZE OUT WHEN THE SHAFT IS NOT ROTATING. THE BEARING WILL NOT NEED ADDITIONAL LUBRICATION SINCE THE SOLID LUBRICANT IS IMPREGNATED INTO THE BUSHING MATERIAL AND IS TRANSFERRED OR "WORN" ONTO THE ROTATING SHAFT AT A RATE DETERMINED BY THE RUBBING SPEED OF ONE MATERIAL TO THE OTHER AND THE IMPOSED LOAD. SINCE THIS IS A "WEAR TYPE" BUSHING, WEAR WILL BE EXPERIENCED UNDER NORMAL OPERATING CONDITIONS.

## INSTALLATION

SHAFT PREPARATION: THE BEARING JOURNAL SHOULD NOT BE EXPOSED TO GREASE, OILS, OR DIRT TO INSURE GOOD LIFE OF THE BEARING. NO OIL OR GREASE SHOULD BE USED ON THE BUSHING OR SHAFT WHEN ASSEMBLING THIS BEARING. THE SHAFT SHOULD BE CLEAN AND FREE OF BURRS OR NICKS. THE SHAFT SOULD BE HELD TO A MINIMUM AMOUNT OF TAPER AND AS LITTLE ECCENTRICITY AS POSSIBLE SO A UNIFORMLY DISTRIBUTED RUBBING SURFACE CAN BE MAINTAINED: FOR BEST RESULTS, THE SHAFT FINISH SHOULD BE HELD TO 10 TO 20 MICROINCHES AND HARDNESS SHOULD BE ROCKWELL "C" OR HIGHER

NOTE: THE 1000 SERIES BUSHINGS MAY HAVE A WHITE FILM IN THE BORE, WHICH SHOULD BE WIPED OFF WITH A CLEAN CLOTH BEFORE ASSEMBLY.

## INSTALLATION OF LT FLANGE BEARING ASSEMBLY

1. SLIDE THE BEARING ON THE SHAFT
2. ALIGN THE BEARING IF NECESSARY.
3. BOLT DOWN BEARING AND SHIM THE BEARING IF NECESSARY.

NOTE: INNER UNIT ASSEMBLIES ARE INSTALLED PROPERLY AT THE FACTORY.
CAUTION: FOR ADDED SERVICE, THE BEARING INNER UNIT MAY BE ROTATED 180° WHILE ON THE SHAFT TO UTILIZE A NEW BEARING SURFACE. UNITS SHOULD NOT BE ROTATED 180° WITH THE STOP-PIN IN PLACE, AS THIS MAY RESTRICT SELF-ALIGNING CAPABILITIES.

## SPECIAL OPERATING CONDITIONS:

CONSULT FACTORY FOR APPLICATION ASSISTANCE, REFER ACID, CHEMICAL, EXTREME OR OTHER SPECIAL CONDITIONS TO RELIANCE ELECTRIC.

# TROUBLE SHOOTING

I. IF DAMPER FAILS TO OPERATE.

A. NO ACTUATOR RESPONSE – AIR OR HYDRAULIC

1. FOR AIR OR HYDRAULIC ACTUATED OPERATORS CHECK THE SUPPLY PRESSURE TO INSURE PROPER OPERATING PRESSURE IS BEING USED.

2. IF SOLENOID IS BEING USED CHECK THE VOLTAGE TO INSURE PROPER SUPPLY CURRENT IS BEING USED. MAKE SURE THE SOLENOID IS PROPERLY SHIFTING AS DESCRIBED IN THE MANUFACTURERS BULLETIN ENCLOSED. FOREIGN MATERIAL SUCH AS DIRT CAN RESTRICT THE PROPER CYCLING OF THE SOLENOID VALVE.

3. SPEED CONTROLS SHOULD BE CHECKED TO MAKE SURE THEY ARE ADJUSTED PROPERLY.

4. IF A POSITIONER IS BEING USED CHECK THE CONTROL SIGNAL TO INSURE THE PROPER COMMAND SIGNAL IS BEING USED.

B. NO ACTUATOR RESPONSE – ELECTRIC

1. CHECK THE ELECTRICAL CONNECTIONS AND VOLTAGE, MAKE SURE THEY COMPLY WITH THE REQUIRED RATINGS.

2. CHECK THE TORQUE SWITCHES, IF TORQUE SWITCHES ARE MADE THE UNIT WILL NOT OPERATE. MANUALLY TURN THE OPERATOR TO DISENGAGE THE TORQUE SWITCHES. THEN TRY TO ELECTRICALLY OPERATE THE UNIT.

II. OPERATOR IS OPERATING CORRECTLY BUT THE BLADES FAILS TO FUNCTION PROPERLY.

A. CHECK FOR OBSTRUCTIONS.

B. MAKE SURE THAT THE OPERATOR IS SECURLY FASTENED TO THE OPERATING SHAFT OR LEVER.

1. A KEY OR PIN MIGHT BE SHEARED.

C. CHECK CLEARANCE BETWEEN BLADE AND BODY, PLUS MATING DUCTWORK.

D. ON UNITS WITH CHAIN DRIVES CHECK TO SEE THAT ALL DRIVE SHAFTS ARE FREE TO ROTATE AND THAT THE CHAINS ARE NOT BROKEN.

E. VERIFY THAT THE DAMPER HOUSING IS FLAT. ANY TWISTING OR BENDING OF THE DAMPER FRAME DUE TO MATING DUCT FLANGES BEING OUT OF SQUARE WILL IMPEDE OR PROHIBIT PROPER OPERATION.

F. CHECK THE BLADE FOR WARPAGE.

1. IF THE BLADES ARE DEFLECTING OR WARPED THIS CAN CAUSE SEVERE OPERATING PROBLEMS.

III. IF ALL OF THE ABOVE HAS BEEN TRIED AND THE DAMPER IS NOT FUNCTIONING PROPERLY CALL MADER DAMPERS (440-355-4505) FAILING TO CONTACT MADER DAMPERS, AND THE CUSTOMER MAKING HIS OWN REPAIRS, WILL VOID THE WARRANTY.

MADER DAMPERS
422 COMMERCE DRIVE EAST
PHONE: (440) 355-4505 * FAX: (440) 355-6582
"E"-MAIL: maderdampers@eriecoast.com

# TENTATIVE SHIPPING DATE SCHEDULE

CUSTOMER NAME: X

CUSTOMER P.O. NO.: X

MADER JOB NO.: X

MADER DWG. NO.: X

DELIVERY TIME IS STRICTLY BASED ON THE RETURN OF APPROVAL DRAWINGS.

WE HAVE RECEIVED YOUR DRAWING APPROVAL ON X

OUR QUOTED DELIVERY TIME IS X

APPROXIMATE SHIP DATE IS X

| | ENGINEER | X |
|---|---|---|
| SIGNATURE | TITLE | DATE |

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MADER DAMPERS
422 COMMERCE DRIVE EAST
PHONE: (440) 355-4505 * FAX: (440) 355-6582
"E"-MAIL: MADRDAMPER@AOL.COM

# SPARE PARTS LIST

CUSTOMER P.O. NO.: 431521

COMPANY: BABCOCK BORSIG POWER

CONTRACT NO.: 100210

MADER JOB NO.: MV-4618

MADER DWG. NO.: MD-4618A

DATE: 01-23-03

| QUANTITY | DESCRIPTION | PRICE | DELIVERY |
|---|---|---|---|
| 8 SETS | PACKING: JOHN CRANE | | |
| | PN#: 100-AL-200 | | |
| 8 | DODGE LT-700 BEARINGS | | |
| | PN#: 033683 | | |
| 4 | AIRFOIL BLADES (BOLTED) | | |
| | PN#: 4618-3 | | |
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MADER DAMPERS
422 COMMERCE DRIVE EAST
PHONE: (440) 355-4505 * FAX. (440) 355-6582
"E"-MAIL: MADRDAMPER@AOL.COM

# SPARE PARTS LIST

CUSTOMER P.O. NO.: 431521

COMPANY: BABCOCK BORSIG POWER

CONTRACT NO.: 100210

MADER JOB NO.: MV-4618

MADER DWG. NO.: MD-4618B

DATE: 01-23-03

| QUANTITY | DESCRIPTION | PRICE | DELIVERY |
|---|---|---|---|
| 8 SETS | PACKING: JOHN CRANE | | |
| | PN#: 100-AL-200 | | |
| 8 | DODGE LT-700 BEARINGS | | |
| | PN#: 033683 | | |
| 4 | AIRFOIL BLADES (BOLTED) | | |
| | PN#: 4618-3 | | |
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MADER DAMPERS
422 COMMERCE DRIVE EAST
PHONE: (440) 355-4505 * FAX: (440) 355-6582
"E"-MAIL: MADRDAMPER@AOL.COM

# SPARE PARTS LIST

CUSTOMER P.O. NO.: 431521

COMPANY: BABCOCK BORSIG POWER

CONTRACT NO.: 100210

MADER JOB NO.: MV-4618

MADER DWG. NO.: MD-4618C

DATE: 01-23-03

| QUANTITY | DESCRIPTION | PRICE | DELIVERY |
|---|---|---|---|
| 4 SETS | PACKING: JOHN CRANE | | |
| | PN#: 100-AL-150 | | |
| 8 | DODGE LT-700 BEARINGS | | |
| | PN#: 033678 | | |
| 4 | AIRFOIL BLADES (BOLTED) | | |
| | PN#: 4618-3 | | |
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